Commonwealth of Kentucky

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# The Direction of Enterprise Information Technology


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# Message from CIO

During the past five years, the Commonwealth of Kentucky has made great strides toward improving the information technology governance model and management agenda. Significant investments have been made in our infrastructure to advance the strategic vision and support the business of government. Key achievements include reorganizing a number of separate departments into a unified agency, the Governor's Office for Technology, defining the role of the Commonwealth CIO in legislation, advancing the enterprise architecture, leveraging service efficiencies, and measuring results.

This document recognizes the established foundation and sets a future direction for IT in the Commonwealth which will help guide IT leaders to make enterprise decisions, maintain our investments, promote cooperative efforts, and reduce the cost of delivering state services.

Most importantly, this document defines what must be done to move forward, outlining the goals and leadership imperatives. Containing a comprehensive set of key recommendations, the desired environment of the future is clearly described. After reviewing the IT strategic direction for the next four years, I believe you will share our vision and commitment to organizational excellence and change.

In recognition of their dedication and hard work, I'd like to highlight the following individuals for the work on the structure and completion of this document:

- Col John Heltzel, Chair, Department of Military Affairs
- Barbara Bean, Kentucky Revenue Cabinet
- Chris Clark, Public Protection and Regulation Cabinet
- John Penfield, Natural Resources and Environmental Protection Cabinet
- Jane Smith, EMPOWER Kentucky, Center for Excellence in Government
- Doug Robinson, Governor’s Office for Technology
- Shirley Rodgers, Governor’s Office for Technology
- Bernadette Zell, Governor’s Office for Technology

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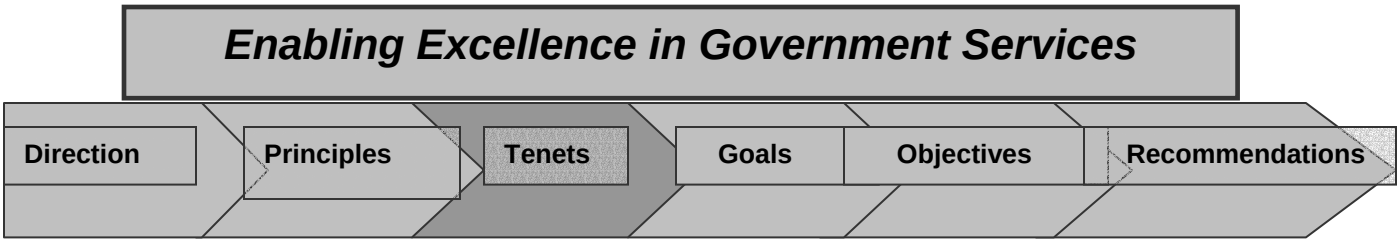
# The Enterprise Direction

This document establishes the Enterprise direction for implementation of information technology (IT) in the Commonwealth. This plan provides Cabinet Secretaries, Agency Leaders, and the Commonwealth's Chief Information Officers (CIOs) guidance and support in developing the critical linkage between agency strategic plans and IT projects.

The Office of the Commonwealth CIO was established in 1998 to provide executive oversight and leadership on all aspects of information technology across state government. The CIO governance structure, including the Governor's Office of Technology (GOT) and agency CIOs, have become instrumental in moving the Commonwealth toward accomplishing the principles of the first Strategic Plan for Information Technology issued in 1997. The five, core guiding principles that formed the foundation for the first plan are still relevant and valid today.

# Five Enterprise Guiding Principles – Reaffirmed

- Support the business objectives of the Commonwealth government
- View technology investments from an enterprise perspective
- Conduct Commonwealth business electronically
- Treat information as a strategic resource
- Ensure electronic access to information and services while maintaining privacy



# Enterprise Tenets for IT Management

The need for efficient and effective customer-focused information systems support remains essential in meeting the needs of citizens of the Commonwealth. It is the role of Agency CIOs and of the Commonwealth CIO to ensure information technology services and projects provide the highest possible return on the Commonwealth's investment. The following operational tenets form the basis for setting the goals and objectives for this plan.


- The Commonwealth's data must be accurate and collected in a timely and efficient manner according to life-cycle standards in support of the business need.
- The business priorities and functional requirements of the Commonwealth will determine investments in information technology.
- Cabinet Secretaries, Agency Leaders, and Commissioners are responsible for agency data and using information technology to meet the objectives of their organizations.
- The Commonwealth's data and information systems must be safe from harm and confidential to protect the rights of citizens and businesses of the Commonwealth.
- The Commonwealth's data standards must address ownership, access, and life-cycle requirements. Common data elements between systems must be actively managed and coordinated.
- The CIO Governance Structure must continue to advance enterprise standards and policies to ensure that all information technology systems can share common data, voice, and video infrastructures.
- The Commonwealth's data and technology expenditures must contribute to the cost-effectiveness of conducting business.
- Enterprise investments and solutions must be central to meeting the Commonwealth's information and technology goals.

# Enterprise IT Goals and Objectives

The Commonwealth **actively manages** information and the information technology infrastructure as a critical resource to seek a competitive advantage in support of its business objectives.


- Technology initiatives directly meet customer needs.
- Investments in Information Technology create a substantial return for the Commonwealth.
- The Enterprise Information Technology Architecture fully addresses all business areas.
- Duplication among IT systems and programs is reduced or eliminated.
- Information life-cycle management and custodianship is established.
- Essential IT services are provided equitably across the Commonwealth.

The Commonwealth **continuously improves** the delivery of services to citizens, customers, and employees to enhance processes through the use of information technology.

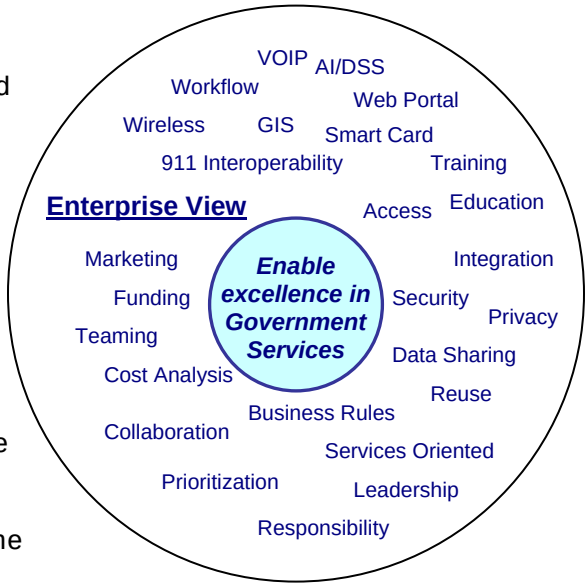

- Progress on business and IT objectives is regularly assessed and reported.
- Communication and feedback between customers, IT specialists, employees, and executive leadership is active and effective.
- Information Technology advances are used to improve business practices.
- Information Technology procurement actions are streamlined and effective.
- The Commonwealth has an effective program for conducting research and development for implementing new technology.
- The career path for the Commonwealth's IT professionals and knowledge workers is coupled with advanced skills development.

The Commonwealth **accurately collects, maintains and exchanges** information while protecting privacy to secure the public trust.


- Enterprise life-cycle management is established for all the Commonwealth's data.
- Enterprise data management standards are established, published and enforced.
- Organizational accountability for enterprise data is accepted and supported.
- Data is efficiently gathered, processed and distributed using Enterprise standards.
- The Enterprise data directory meets the core need for access to citizen data.
- Data is classified, encrypted and stored safely.
- Data protection and privacy are consistently enforced.

# Next Steps and Recommendations

Today, citizens and other customers expect government to provide the same convenience and self-service they receive in the marketplace. The expectation is that "Everyday Government" will deliver excellence: services in a convenient, efficient, and economical manner, while maintaining appropriate security and privacy measures. This Everyday Government will provide One Face of Government and eliminate silos of information in agencies and service delivery to taxpayers. How do we get there?




The following recommendations outline Enterprise requirements to accomplish the Information Technology Goals and Objectives. Each recommendation is followed by a description of the desired environment or end state.

## The Leadership Imperative

### IT Governance Structure

Studies indicate that an effective governance structure is the single most important predictor of obtaining value from information technology. Under the leadership of the Commonwealth CIO, the current confederation of CIOs has proven itself, through the CIO Advisory Council, the Enterprise Architecture and Standards Committee, and other technical advisory committees. Not only has the governance structure provided consistent points of contact among agencies, the Commonwealth has benefited by increased cooperation, information sharing, and adoption of better standards.

#### Desired Environment

- The IT governance structure is formalized, recognized, and active in defining the values, vision, and operating principles regarding the use of information technology, and builds a culture of positive growth and success.
- The IT governance structure enables an effective dialogue to address the competing forces across the enterprise and creates common goals and objectives in support of enterprise business goals.
- The IT governance structure and supporting work groups provide guidance and feedback on enterprise technology efforts to achieve the Commonwealth's goals. This is accomplished by active collaboration that adds value and balances agency risk.
- The Commonwealth achieves above average returns from IT investments by making consistently better IT-related decisions.
- The Legislature, Judiciary, and the Office of State Budget Director have executive and operating level IT work groups that enhance cooperation and their level of involvement in the CIO Advisory Council and subgroups.
- IT services to customer agencies meet or exceed identified requirements.

- IT governance bodies develop a strategy and sequence for service consolidation to reach maximum efficiency.
- IT governance bodies result in a more responsive organization and increase the quality and quantity of roles for interested members of the community
- The IT governance structure addresses enterprise and agency priorities and operational needs while strengthening relationships within the IT community.
- IT governance bodies actively encourage and leverage the ingenuity of all the Commonwealth's knowledge workers to enforce compliance with the overall vision and principles.

# Enterprise Interoperability Standards

The need for business processes to be fully integrated to meet service and support requirements is well-established. It is essential that the CIO governance team promotes the interoperability of data and systems to maximize the Commonwealth's investment. Interoperability will streamline workflow, support integrated business transactions, provide the desired return on investment, reduce costs, and increase the reliability and effectiveness of services. Full systems and data integration and interoperability require technological innovation and a variety of new procedures and policies.

## Desired Environment

- New system designs decrease the reliance on proprietary components and separate the end-user computing device from the network or physical data structure.
- Development projects focus on systems integration via technologies that enhance interoperability.
- The Commonwealth has standardized electronic business architectures, terminologies, infrastructure, business documents, and workflow.
- New development specifications mandate open architectures that position the Commonwealth to take maximum advantage of global business-to-business data interchanges. Enterprise IT architecture encourages interoperability based on common elements and systems interfaces.
- The Commonwealth is open to businesses and customers throughout the world.
- The Enterprise Architecture provides a single access topology to exchange business data with authorized users and systems.
- New system developments maximize the use of common business processes and message exchanges by reusing existing standard objects and procedures.
- Electronic business documents are embedded with system-mapped data for workflow management and efficient processing.
- The Commonwealth is well positioned to adapt to shifting government requirements that transcend current boundaries and system limitations.
- A common system vocabulary is developed to expedite the establishment of business relationships and to ensure that system messages and data have a consistent understanding between users and systems.
- The Commonwealth strives to identify and remove organizational, legal, and procedural barriers to information sharing and reuse.

# Enterprise Architecture

## Service-Oriented Architecture

Information integration and accessibility are potentially the biggest issues for the Commonwealth and the IT Governance Structure teams to bring to terms. From a technological standpoint, the Commonwealth is well poised to deliver on the promise of integrated data access for collaboration and systems integration. The Enterprise requires a new information technology architecture to support this virtual integration. The Service-Oriented Architecture (SOA) is comprised of components and interconnections that focus on interoperability and location transparency. The Commonwealth must create the environment and culture that will support the extension of customer support capabilities built on business process information integration. Through these new systems, the Commonwealth will be able to offer network ready applications that directly support the customer driven requirement for Internet services and document-oriented technologies. These new systems and services will be delivered on network software components that focus on interoperability, data ownership, responsibility, and access.


### Desired Environment

- Business integration standards in terms of programming languages, operating systems, application interfaces, access protocols, and networking protocols are established, published, and serve the needs of the Commonwealth.
- New systems and applications are substantially easier to use with embedded interoperable functions.
- The service-oriented architecture produces economic benefit for Commonwealth agencies. The business community plays a vital role in developing the extended architecture based on business needs.
- The computing environment supports managed information delivery models. The Enterprise migrates where feasible to shared pools for IT resources.
- The IT Infrastructure provides the customer base with the ability to self-manage agency data.
- The service-oriented architecture provides the Enterprise with an increased capacity for applications mobility. The location of data is transparent, resulting in a higher degree of flexibility in systems development, support, and maintenance.
- The service-oriented architecture supports a higher level of information security based on the ability to support user authentication at both the client level and at the service level.
- The service-oriented architecture provides the highest level of systems and information availability. Enterprise servers run multiple instances of services allowing the network to redirect information service requests in the event of a system failure.

## Security Architecture

The Enterprise need for improved tools that detect security risks and identify solutions continues to mount. An expanded need for information access through a variety of services and technology architectures is driving the need for advanced information security services. In order for the Commonwealth to protect its resources, minimize risk, and maintain a competitive advantage, it is essential that information systems security be robust and provide the maximum level of protection while supporting new requirements for access. Technologies and techniques are needed that focus on the identification of authenticated users, privileges, and restrictions.

### Desired Environment

- Key information security policies and practices are identified and in place that successfully safeguard the IT Infrastructure.
- The Enterprise Infrastructure provides the highest level of identity management and actively serves both public and private authentication and credentialing.
- The Commonwealth's security posture employs tools and services that gather event records, prioritize security incidents, separate real security violations from false alarms, and aggregates security events for resolution.
- Security is an active part of all systems architectures.
- The Commonwealth security architecture meets or exceeds the need for continuous monitoring and management that successfully mitigates the risks associated with electronic systems.
- The Commonwealth security architecture meets the needs of the Enterprise and key commercial customers to conduct electronic business.

## Wireless Infrastructure

The untethered network has as much promise to change the core business functions and services for the customers of the Commonwealth as the advent of the World Wide Web. Devices, systems, and services will exchange information seamlessly and open a new avenue for economic development. The Commonwealth will be best served by taking an active stance in developing the Enterprise capability for wireless. The Commonwealth's position on the ability to access enterprise data via these new wireless solutions will help it to gain and maintain a competitive advantage. A real-time, flexible communication infrastructure is one of the key drivers of data usage. The adoption of wireless communication infrastructure and support for wireless services will position the Commonwealth to take maximum advantage of these new technologies. Wireless communications that provide time sensitive access to Enterprise information and services will deliver an economic building block that will set the Commonwealth apart from its peers.

### Desired Environment

- Wireless communications is fully viable across the Commonwealth.
- A full suite of services, policies, and infrastructure solutions is in place.
- The Commonwealth's customer requirements provide the direction for infrastructure expansion with executive commitment and legislative buy-in.
- Wireless electronic transactions are incorporated into new enterprise systems designs.
- Wireless connectivity enhances productivity for the Commonwealth's workforce and decreases time and cost factors.
- Secure wireless e-mail and access services are the norm across the enterprise mobile workforce.
- The Commonwealth's wireless campus strategy supports enterprise access in all major government locations.
- The Commonwealth actively works with communications providers to develop and implement wireless access equitably across the Commonwealth.
- Wireless communication is recognized as another communications media and is subject to the same governance, architecture/standard, practice, and policy disciplines as traditional wireline media.

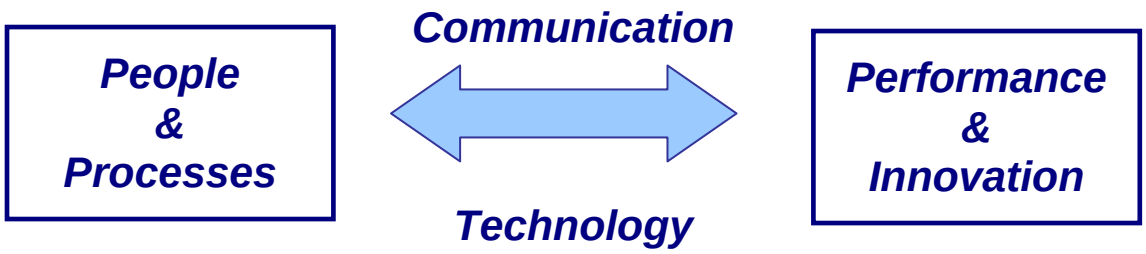
## Information Technology Investments

The complex and rapidly changing information technology environment requires active committed management to ensure that IT resources are properly leveraged and integrated. CIOs must actively manage all agency mission-critical projects to maximize the investment in Information Technology. Active management at the Enterprise level will produce significant operational improvements, increase visibility, and enhance interaction among agencies.

### Desired Environment

- Agency IT management effectively reviews plans for new systems and manages their IT projects to standard.
- The CIO governance structure coordinates enterprise standards for system enhancements and system sunset milestones.
- The CIO governance structure classifies and prioritizes projects and seeks executive support.
- The CIO governance structure and workgroups monitor and measure performance and make recommendations for improvement across the enterprise.
- Coordinated enterprise and agency reviews uncover planned systems duplication before resources are committed.
- New systems development design and implementation efforts are discussed and IT lessons learned are published that generate cost-savings and efficiency.
- The CIO governance structure recommends IT reforms resulting in service levels that meet or exceed customer requirements and expectations.
- Redundant IT support activities are identified and scheduled for elimination or reduction.

- Planned implementation of new and emerging technology is tempered with the practical need to continue stable and cost effective support for ongoing operation.




## Purpose Driven

### Enterprise IT Priority List

In order to gain enterprise visibility, it is essential that the Commonwealth CIO assemble a comprehensive ranked document that details the mission critical IT requirements that impact the Enterprise. The Enterprise IT Priority List identifies those projects that apply across a majority of agencies, require cross-boundary integration or require executive support for essential resources, or directly impact the health, safety, or welfare of citizens.

### Desired Environment

- Avenues for clear communications and dialogue are established and effective.
- The Enterprise IT Priority List guides the discussion and funding for Enterprise level IT services, initiatives, projects, and support during Capital Planning efforts.
- Agencies develop a common understanding of the opportunities, threats, and requirements across the enterprise.
- Enterprise issues are fully evaluated and produce a call for executive and legislative action.
- The leadership and organizational resources needed to successfully address the issues are clearly identified.
- Potential strategies and action plans for meeting requirements are generated.
- Identified IT solutions are jointly planned and reviewed by GOT and agency CIOs.

### Data Integration Priorities and Timeframes

It is essential that realistic, progressive milestones for data integration are established and agreed upon to meet emerging business demands of internal business elements, customers, and the emerging IT architecture issues. The need to support Cost Benefit Reengineering (CBR) initiatives designed to reduce operational costs is substantial. Executive commitment and CIO leadership on setting and adhering to integration

priorities and system design timelines is required to meet demands for new and extended systems.

### Desired Environment

- The Commonwealth has a viable plan with associated milestones for integrating existing data sets and information streams.
- There is substantial Executive and Legislative commitment and support for achieving the goals of the data integration effort.
- Application development costs are reduced and the speed time-to-service solution for new applications is reduced.
- Applications systems maintenance costs are reduced.
- Increased enterprise-wide information sharing increases the Return on Investment (ROI) on existing legacy systems.
- The Commonwealth is well-positioned to develop a flexible, low-maintenance data architecture that can power the enterprise towards real-time data access.
- Agencies discover and share information seamlessly integrating information assets throughout the enterprise.

## Continuity

### IT Lifecycle Requirements

Successful projects require executive sponsorship, commitment, collaboration, and communication. Commonwealth IT Projects will be actively managed from inception to completion throughout the life-cycle of systems and data to ensure requirements of the Commonwealth's customers are consistently met.

### Desired Environment

- IT projects have a clearly defined business case that documents the project's alignment with the organizational mission and goals.
- IT Projects are professionally managed to the Commonwealth IT project management standards.
- Executive commitment and project sponsorship accompanies the required fiscal resources.
- Business process realignment is completed prior to IT project initiation.
- Open communications regarding project direction, priority, and status is routinely practiced.
- Agency leadership is committed to implementing high value services and support.

### Data Lifecycle Management

As the Commonwealth transitions to a knowledge enterprise, it is essential that agencies undergo fundamental changes in the way they view the creation, processing, distribution, and retirement of organizational information. Lifecycle management

practices that govern all phases of the information life-cycle must be adopted. The policies and procedures created to facilitate this effort will have far reaching impact as agencies integrate data and systems.

### Desired Environment

- Management practices to protect the Commonwealth's investment are in place and active.
- Enterprise data ownership and validation principles are coordinated, adopted, and understood, supporting cross agency use for the public benefit.
- The Commonwealth maximizes the economic and social value of data to extend its utility.
- The Commonwealth supports the investments made in data life-cycle management to sustain the acquisition, processing, and supply of mission essential information.
- The Agency CIOs have established mechanisms to increase user feedback to improve responsiveness and accuracy of data acquisition and use.
- The general principles of nondiscriminatory pubic access to data are developed and applied to the fullest extent possible within available resources and security provisions
- The Commonwealth has a mature set of criteria and priorities for data acquisition, processing, distribution, preservation, archiving, and destruction.
- The Commonwealth's data is easily accessible, including metadata regarding information quality and context.
- The Commonwealth provides facilities and support for locating and obtaining data.
- Data management standards are developed in concert with the agency data authorities.
- Data management standards address all forms of information recording, storage, processing, and communication.

## IT Planning

The agency strategic planning process produces important business issues, priorities, opportunities, and challenges, and corresponding mission critical Information Technology requirements. These requirements will form the core of the agency's IT projects.

### Desired Environment

- CIOs maintain a prioritized list of initiatives that support the agency's plan for the implementation of technology and the allocation of resources.
- Agency IT priority lists are regularly reviewed and prioritized by agency executive management.
- Agency IT Priority lists are regularly reviewed and discussed at CIO Council meetings to look for common areas of interest and effort.
- Common IT challenges, priorities and requirements are elevated to the Commonwealth CIO for consideration for Enterprise funding or identification.

## IT Budgeting

To fully secure the benefits generated by a robust information technology environment, the Commonwealth must align its financial resources with the Executive vision. This will require each agency to institute a measured and consistent budget that realistically funds the continuation of mission critical current IT initiatives and allows for future growth. Maintaining a steady investment in the enterprise IT infrastructure is essential to ensure Kentucky maintains a competitive status with other states.

### Desired Environment

- New, appropriate account structures support an active and open dialogue allowing GOPM to work effectively with agencies and the Commonwealth CIO to secure and manage necessary IT resources.
- All agencies and executive leadership are fully committed to a responsible long-term approach that recognizes the high level of state services relying on computer equipment and systems.
- Cabinets effectively budget for data and information systems life cycle requirements to include enhancement, replacement, and maintenance.
- The Commonwealth recognizes the contribution of information technology and knowledge workers and invests in productivity tools and training to enhance performance and protect resources.
- The CIO governance structure provides executive leadership in formalizing critical decisions regarding the allocation of increasingly limited funds.
- Information Technology budgets are directly tied to the agency strategic plan as a product of the joint vision of management and technology personnel.
- CIOs are able to effectively calculate the return on the IT investment in concert with reduced costs, increased efficiencies, or new capabilities regarding the use of new technology.
- CIOs are capable of articulating IT initiatives using non-technical terminology to ensure clarity and understanding of business decision makers.

## Enterprise IT Funding

The Commonwealth's investment in Information Technology is substantial. The efficiency and effectiveness of nearly every segment of the government is directly dependant on information technology to work efficiently and to remain competitive in an environment of continuous change. It is short-sighted to minimally fund, or fail to recognize the funding stream requirements of agencies, for a successful transition to a knowledge organization. In order for the Commonwealth to meet the needs of citizens it is essential that Enterprise and agency modernization projects be identified and funded to minimize direct service costs. Agency budgets for Information Technology are essential to protect current investments.

### Desired Environment

- Agency IT requirements are identified during the budget process tracked and funded.
- Agencies are encouraged to maintain baseline enterprise standards to remain current at maximum efficiency and interoperability level.

- Agency leaders are fully aware of the IT budget requirements and the impact of minimal funding on achieving agency goals and objectives
- Total cost of ownership of the IT Infrastructure is a factor in developing agency and enterprise standards and procurement plans for IT services and equipment.
- The Commonwealth CIO has visibility of agency IT budgets and lends support to agency CIOs in making the case for agency IT investments.
- IT investment successes and issues have Cabinet level visibility.
- A mechanism for IT infrastructure funding for planning and purchases beyond those covered in Capital Planning is in place.
- A direct appropriation for enterprise technology investments is available to the Commonwealth CIO for enterprise support activities (including bid solicitation and contract negotiation).
- Funds are available to agencies as matching grants for IT research and development.
- Mission essential IT projects are fully funded to ensure the quality and required business requirements functionality is implemented.

## IT Procurement

For the Commonwealth to take maximum advantage of new and different technologies and services while minimizing risk, the IT procurement process must be as efficient and flexible as possible. The enterprise is best served by relying on the planning and budgeting process to achieve strategic objectives. Information Technology sourcing requires a system that allows agencies to execute procurements against data systems requirement contracts and ordered as a standard commodity. Prolonged procurement cycles exacerbate the customer-driven requirements for Information Technology support.

### Desired Environment

- The enterprise procurement system supports coordinated IT purchasing to reduce costs and promotes standardization.
- CIOs plan IT life-cycle requirements using pre-competed contracts to achieve greater flexibility in IT services, support, software, and equipment resulting in a streamlined process for the procurement of common architecture items.
- The Governor's Office for Technology maintains an IT Storefront. The Storefront provides a location for new technology demonstrations, displays, training, and hosted events for agencies to evaluate and procure Enterprise IT architecture items.
- The enterprise consistently leverages the volume purchasing power of the state through various contract devices that emphasize federal and multi-state vehicles.
- The Governor's Office for Technology exercises delegated authority for technology procurements.

# Means To Achieve

## IT Professionals and Knowledge Workers

The IT Professional staff and skilled knowledge workers are the most important elements required for the Commonwealth to fully capitalize on the advantages and efficiencies of new information technologies. It is essential that the Commonwealth maintains programs and initiatives that develop, support, and reward these skilled workers in accordance with their demand in the civilian marketplace.

### Desired Environment

- The Commonwealth has formal programs that recognize, develop, sustain, and reward IT workers for their creativity and innovative contributions in creating new business opportunities and efficiencies.
- The executive and leadership capabilities (mindsets, knowledge, and skills) needed to fully embrace information technologies are actively developed and supported.
- The baseline set of employee information technology skills is identified and cultivated to meet the enterprise knowledge management requirements. This results in a positive culture of information sharing, relationship building, and trust.
- Information and knowledge workers routinely re-design processes or create new service capabilities to boost internal productivity and improve customer service.
- The Commonwealth uses collaboration and active knowledge sharing technologies to engage customers in communities of interest and directly supports e-learning and embedded customer value-added services.
- The Commonwealth's professional IT staff is positively regarded for their ability to respond to constantly changing customer requirements and market trends.

## Forging Partnerships

The environment of tomorrow will dictate new requirements for forming joint research and development organizations. The goal of these cooperative relationships will be to design systems and services for the public benefit in the pursuit of social and equitable objectives. The public sector must address the growing dependence on external service providers in a positive manner. Market economics will drive government and business together to share development risks and benefits and to address the increasing complexity required to manage new strategic relationships. The Commonwealth is best served by taking a lead role in forming these alliances between government, educational research organizations and business consortia. Failing to take the lead will result in a loss of momentum, options, and flexibility to direct the efforts in a manner that provide economic stimulus for the Commonwealth and generate a competitive advantage.

### Desired Environment

- The Commonwealth has fully implemented the business case rules and procedures to foster the development of systems and services for joint

enterprise initiatives.

- Joint development efforts are profitable for all the parties involved. Common goals are achieved that produce national recognition and competitive or economic benefit to the Commonwealth.
- Joint research and development efforts provide the Commonwealth protection and a higher level of services for its citizens. Partners realize gains that reinforce their commitment to joint development efforts.
- The Commonwealth adopts a new course that results in favorable regulations and an advantageous climate for business and government joint efforts that increase the skills, technology, and capabilities available to enterprise agencies.
- The roles and responsibilities of the public sector are supported by the capabilities of the private sector to deliver and manage electronic services at optimum levels across the Commonwealth.
- The Commonwealth is regarded as a business-friendly environment that supports research and design, information technology skills development, integrated demonstration storefronts, and advanced educational programs to develop the full spectrum of IT expertise.

# Expecting Results

## Commonwealth Data Directory

The goal of accurate and timely information requires the Commonwealth to actively manage information throughout its life-cycle. Accurate information is only of value if it has commonly understood meaning across the whole enterprise. The Commonwealth Data Directory (CDD) is a repository representing all of the information requirements, systems, structures, processes, access policies, and data objects that define information across the enterprise. The CDD is the central facility for describing enterprise data, meaning, context, uses, and functionality. The Data Map is data about data or Meta data. The CDD is a key enabler of systems interoperability and increases the utility of enterprise data. The directory is an architecture of relationships, ownership, and access, and is not a single physical structure.

### Desired Environment

- The Commonwealth's Data Directory contains metadata on all system interfaces, relationships, data objects, data sources, geographic coordinates, and reference indexes.
- The Directory establishes an Enterprise view of data and positions the Commonwealth to take strategic advantage of the enterprise systems.
- Virtual data warehouses support data processing operations, customer service support, customer self-service, and event management by providing universal secure access to key enterprise data.
- The data directory enables agencies and business partners to integrate datasets and manage identity information across the enterprise.
- The CDD structures support rule-based computing and streamlined systems

development.

- The CDD makes enterprise business models, rules, and data objects available.
- The Directory encompasses the structure and relationships for all enterprise domains of enterprise knowledge that aid in complex decision-making.
- The CDD describes business processes in terms of inputs, outputs, business objects, and data.
- Agency CIOs use the CDD to document business requirements and communicate with agency leadership on the current and future information architecture issues and potential change management options.

## Enterprise Agents of Change

Key successes emerging from the 1997 plan were the establishment of the Office of the CIO and the agency CIO. To build on these, it is essential that the agency CIOs and the Commonwealth CIO develop the relationships and technical capabilities to accomplish the operating vision of Cabinet secretaries and Agency Leadership. CIOs must function as business process realignment leaders based on the implementation of transforming information technologies. CIOs will promote positive change across the enterprise by delivering efficiencies and increased effectiveness using information technology.

### Desired Environment

- CIOs focus on leading change rather than managing change.
- CIOs work closely with Cabinet leaders and business operating elements to identify technologies and solutions that support the development of new efficient and effective methods for delivering high quality services.
- Information technology driven change is commonly accepted as a force and opportunity for generating new methods and capabilities.
- CIOs are directly involved in strategic and future planning efforts linking vision and direction to business process reengineering, streamlining and increased efficiency.
- Managers and Employees seek CIO support and involvement in the planning and implementation of business systems.
- Organizational change is viewed as opportunity to fine tune performance flexibility.
- CIOs possess business skills that include leadership, marketing, financial, risk assessment, and project management that support the ability to lead organizational change.
- CIOs communicate a clear vision and agenda for using IT to enable the business.
- CIOs make informed technology decisions about business models, business architecture, and enterprise IT-governance issues, in conjunction with Cabinet Secretaries, Agency Leaders, and Commissioners.
- Agency leaders have a solid grasp on how to deploy IT to meet agency business strategies and work closely with the CIO on IT decisions.

## IT Organizational Excellence

To maintain and grow exceptional employees in Information Technology and Knowledge Management organizations, it is imperative that the Commonwealth develops innovative programs that recognize and motivate career employees working in complex and difficult environments. Recognition and public acknowledgement sustain a superior workforce and provide motivation for new employees. Agency reward programs should support the ability to reapply program-generated resource savings to new, under-funded projects that demonstrate great potential for new efficiencies.

### Desired Environment

- Operating policies and programs create a profit motive type of incentive within state government agencies to maximize efficiencies.
- Employees whose contributions enable savings to the organization, or who have exceeded expectations for service, are formally and publicly recognized and rewarded.
- Agencies that develop successful cost savings receive a portion of that savings to invest in additional or new development.
- A portion of saved or lapsed funds generated by efficiencies produced by successful IT projects is available for new agency initiatives.
- The CIO Advisory Council Award of Excellence is fully implemented and increases the sense of community and commitment within the Commonwealth's information technology professionals.

# Enterprise Enablers

Technologies will continue to influence and shape the way the Commonwealth conducts business. Continuing advances in technologies and systems have the ability to fundamentally change the way people interact with each other and with government agencies at all levels. As these technologies mature, the Commonwealth must ensure that new ways of conducting business are incorporated into the Enterprise Information Technology Architecture and Infostructure.

## Information Access

The goal of universal access is to establish a common customer internet access point (portal) that provides access to the enterprise data via secure, web-enabled applications. Employees, customers and partners need a single point of access to information available at anytime to increase productivity and enable organizations to make better, faster decisions. The portal will position the Commonwealth to reap the benefit of increased performance, decreased response time, and lower system operating costs.

## GIS-Integrated Spatial Data Sets

Geographic Information Systems have the ability to link data to provide a new unique perspective. Certain data sets, without the associated geographic coding, lose much of their meaning and essence. In order for the Commonwealth to reap the maximum advantage for the investment in IT systems, it is essential that the data collected be effectively related in all possible ways. GIS encoded systems are poised to form the central repositories and integration super sets of Commonwealth data.

## Workflow Management

Workflow systems involve embedded management controls integrated with electronic documents that can produce a significant return on investment (ROI), and provide business managers with built in business process metrics and measurements. Workflow designs focus on Enterprise Application Integration (EAI) and deliver system-to-system, straight-through processing to create new levels of efficiency and information flow across the organization. These systems work extensively on business rule mapping and automatic rule selection to achieve improvements in productivity and responsiveness.

## Communications and Collaboration Tools

New, converged technologies will provide the Commonwealth the ability to meet increasing customer requirements for new services and extend employee capabilities. The convergence in advanced voice, video, and text messaging can enhance teamwork between offices, agencies, and departments and allow the Commonwealth to extend its area of operations directly to the customers and supplies of the Commonwealth's data and business partners. Maintaining a progressive stance towards the implementation of these technologies is critical to achieving a competitive advantage.

## Knowledge Management Tools

Rules based computing, integrated data sets, and advanced forms of data exchange using XML will deliver on the promise of Artificial Intelligence and Automated Decision Support Systems before the end of this decade. The Commonwealth must take advantage of these system efficiencies to deal with the decrease in qualified IT

professionals and the projected decreased in the overall number of state employees.

## Unattended Data Collection Devices

Commercial enterprises are increasingly more dependant on radio frequency control tags and In Transit Visibility (ITV) devices for gathering remote information on shipments and movement. The Commonwealth should capitalize on this effort and embed these devices in its own systems to take maximum opportunity provided by the efficiencies and effectiveness provided by remote unattended devices for data collection.

## Mobile Office Technologies

The mobile office is a suite of supported technologies that will free Commonwealth employees from desk bound stations and enable quality work to be conducted in remote work areas. The core functionality to meet this requirement is statewide wireless connectivity for a host of devices and applications.

## Interoperable Emergency Communication Systems

The Commonwealth requires seamless statewide interoperability between communications systems that contain the ability to provide embedded geographic coding locations with emergency response override capability. The need for a single or integrated radio and phone network is essential in protecting the health and welfare of citizens and the Commonwealth's first responders.

## Enterprise Identity and Access Management

Recent events mandate that the Commonwealth move to more reliable and secure means for identifying employees, customers, and providers. The Commonwealth must explore a variety of developing technologies, including biometrics, to provide real-time identification for authorized information system access.

## Content Management

Based on the nature of networks and the desire to provide open, secure access, the Commonwealth will face the challenge of enforcing the policies and procedures required to ensure that malicious or felonious content is effectively eliminated from all Commonwealth systems. These systems must be flexible to ensure mission required operations are not impeded, while offering the highest level of protection.

## Enterprise Integration

Technological advances in systems coding and data structures are providing the Enterprise with the ability to fully integrate systems at the data level. However, significant cultural issues must be addressed to maximize the potential of these new capabilities. The movement towards technical synchronization between agencies should not force any agency to sacrifice its ability for independent operational mission requirements.

## IT Acquisition Services

To meet the Enterprise mission it is a fundamental requirement that new, proactive, and flexible acquisition processes and procedures be adopted for maximum efficiency and standardization. Only through this effort will the Commonwealth reach the goals of improved services, architectural standardization, and quality support. Unless

current IT procurement process is revolutionized, the Commonwealth will continue to purchase technology that is outdated before it is delivered.

### Enterprise Infostructure Implementation

The Commonwealth is moving toward a knowledge-based organization to meet its mission. To take competitive advantage of new information types, collaboration and communication techniques will require a new structure devoted to maximizing the enterprise investment in information or Infostructure. The Infostructure focuses on enterprise standards and functions for maximum efficiencies while integrating new knowledge management techniques in the Commonwealth business operations. The Infostructure supports the implementation of the Commonwealth Data Map.

## The Strategic Environment

The period covered under this Strategic Direction document follows a decade of technological innovation that ushered in a period of dramatic cultural and business change. Very little in the environment has stabilized in the new century. Continuing technological advancement is directly responsible for broad changes in governmental capabilities and customer expectations as change transforms the economic and cultural landscape.

Listed below are some of the changes that will impact the Commonwealth as it delivers increasingly sophisticated services to its customer and constituent base. The sections are divided into Information Technology and Information Technology Management and Government and Business Process Change.

### Advances in IT

#### Convergence

In the near future, the integration of multiple services and formats of delivery and data systems will fundamentally revise the customer's definition of accessibility. The requirement to meet customer-driven demands for end-to-end services and higher levels of quality are rapidly generating market forces pushing forward scale economies in bandwidth provisioning. These new services and capabilities will require regulatory and management solutions to support advanced interconnection and delivery options. Governmental customers and providers will force IT management to offer and directly support more convenient, reliable, and auditable solutions. The most likely convergent disciplines involve voice and data communications and messaging systems. Self-configuring devices and portable, network-supported services will extend well beyond cell phones and desktop computers and integrate voice, data and video access.

#### Ubiquitous Computing and Networking Devices

The era of networked, always-on computing devices embedded in the environment has begun. Brought about and fueled by the convergence of multiple technologies, the pervasive computing environment of the future will be comprised of wearable computers, smart homes, and smart buildings. These interconnected, intuitive systems will fuel new techniques and tools resulting in advanced systems that utilize speech

recognition, perceptive interfaces, reconfigurable processors and micro-electro-mechanical systems. Systems will automatically collect information and provide it to the customer and service provider with little or no user intervention. These systems will make the reconfiguration and design of computing systems mandatory to harness the power of the new capabilities.

### Nanotechnology and Ultra Miniaturization

The drive towards nanotechnology and miniaturization is producing a revolution in a variety of new fields and system capabilities. From a computing perspective, recent advances in computing power, based on success achieved at the Nano (1 billionth of meter) level of design are producing computers that are vastly more powerful, easier to use, and more economical to operate than current systems. Most dramatic are the changes that nanotechnology is bringing to the development of nanomaterials, nanoelectronics, nanooptics, and nanochemicals. These advances will produce product performance and cheaper production costs on material and services affecting almost every aspect of our lives. The drive towards advanced nanotechnology will provide a significant stimulus for economic advancement for the communities that are prepared to provide the optimum environment for business.

### Virtually Unlimited System Storage Capacity

The price and performance levels of current storage capacities are exceeding Moore's Law regarding the performance exponentiation of computer chip manufactures. With advances in technology and storage mediums exploding, the ability to store virtually everything on organizationally controlled hardware and networked devices is on the brink of reality. This capacity will require governmental organizations to focus on setting formal policies governing the acquisition, use, public access, and advances in records retention, availability, and retrieval.

### Server and Services Consolidation

The business incentives for systems and services consolidation are being driven by the requirement to achieve higher levels of efficiency. This can be accomplished by reducing the cost of maintaining legacy systems and implementing common platforms for standard services. In order to achieve these goals, the enterprise and its agencies must adhere to the principles of standardization, consistency, and reuse. The business imperative of reduced funding for systems and personnel and the need to replicate systems to address security issues are central to this effort.

## Government and Business Process Change

Increased Emphasis on Cost Effectiveness versus Growth - The reality is that there is less business capital to support extensive growth in the IT area without showing a direct, substantial return on the investment. The goal for the next period will be to achieve a reduction of the enterprise Total Cost of Ownership (TCO) for IT by improving the effectiveness of IT operations and the production of business efficiencies in concert with controlled IT expansion throughout the Enterprise.

### Presence: Instant Communications and Messaging

The customer base will simply not tolerate the traditional delays in governmental services associated with current and past systems. Based on commercial advances and

personal systems capabilities, new governmental systems will have to provide a higher level of personalized service and response in order to meet the constituents needs.

## IT Staffing

Without major changes in the economic picture for the Commonwealth, it is fairly safe to predict that agencies will see relatively flat IT staffing levels. In order to maintain an emphasis for growth or to maintain existing levels to meet expanding organizational requirements, IT managers will be forced to adopt the most efficient enterprise standards, systems, and methods of information delivery. IT staffs will have to posses multiple skill sets and be capable of working in multiple environments. This will require an expanded knowledge of the enterprise systems, interfaces, and data sets along with an increased level of skills.

## Greater Requirements for Staff Training and Expertise

IT and Knowledge Worker skill sets are irreplaceable factors in an agency's desire for high performance and mission success. These skills must be built through a variety of training opportunities and exposure to new techniques and technologies throughout a career. The Commonwealth must put a premium on experience and abilities. As the work must be completed with fewer and fewer employees, only by investing in training and maintaining qualified professional employees will the Commonwealth be able to satisfy the requirements of citizens.

## Business Integration Initiatives and Support Centers

Similar processes and procedures, in separate agencies, wherever applicable, must change in order to meet or exceed the goals for efficiency. This will require mandatory governance over processes and standards with full participation of all agencies and the support of the executive leadership. These changes in the way the Commonwealth conducts business need to have specific support centers to ease the adoption of new technologies and techniques.

## Change Management and Leadership

Change is the one constant that all parties will be subjected to and must endure collectively to improve the business process of the Commonwealth. To effectively deal with the rate and degrees of change in a progressive and forward thinking manner, agency executive leadership and agency CIOs, working with the Commonwealth CIO, must prepare the systems and solutions that ensure precious resources are committed in a manner that will provide maximum benefit. Leadership must be present at all levels.

## Optimization of Resources

In a period of diminished resources, the organization must protect its current investment and actively plan the expenditure of any additional resources. Agencies may be forced to band together for mutual support. Enterprise initiatives may be the most appropriate investments that can be made. The Commonwealth's economic forecast for the period of this plan mandates an active management plan to protect and optimize the enterprise investment.